Buildings Technology Research and Development Subcommittee Meeting

April 21, 2011

Location: 950 L'Enfant Plaza DOE
Time: 1:30-3:30 p.m.

Attendees[1]	**Agency/Office**	
Shyam Sunder	DOC/NIST	BTRD Co-chair
Roland Risser	DOE/EE-Buildings	BTRD Co-chair
Nick Sinai	EOP/OSTP	
William Grosshandler	DOC/NIST	
Paul Domich	DOC/NIST	BTRD Ex-Sec
Alan Schroeder	DOE/EE-Buildings	
George Hernandez	DOE/EE-Buildings/PNL	
Joe Hagerman	DOE/EE-Buildings	
Diane Stewart (telephone)	HHS	
Jonathan Herz	HHS	
Ted Kozak	HHS	
Ecton English	DOD/NSA	
Chris Weber	STPI	
Kevin Kampschroer	GSA – Presenter	
Judith Heerwagen	GSA	
Joni Teter	GSA	
Kinga Porst	GSA	
Brian Wright	GSA	
Ruth Kroeger	GSA	
Casey Burns	GSA	
Henry Singer	GSA - Presenter	
Jeff Marqusee	DOD/SERDP/ESTCP - Presenter	
Ilker Adiguzel (telephone)	ERDC USACE	
Allen Whitley	Smithsonian	

Next Meeting: June 16, 2011 1:30 - 3:30 PM, 950 L'Enfant Plaza DOE

Meeting Calendar:

May 19, 2011(senior principals only)	September 15, 2011
June 16, 2011	October 13, 2011
July 21, 2011	November 17, 2011
August 18, 2011	December 15, 2011

[1] Active Members not attending identified in light gray

Introductions: William Grosshandler (NIST) opened the monthly meeting of the Subcommittee for Buildings Technology Research and Development (BTRD) welcoming the agency representatives and thanking them for their participation. All participants provided self-introductions.

Review of Minutes: Members reviewed the March 2010 BTRD Minutes prior to the start of the meeting.

FACA Requirements: Pedro Espina (OSTP), the NSTC Executive Director, provided the members with an overview of existing Federal Advisory Committee Act (FACA) requirements. Please see http://www.gsa.gov/portal/content/104514 for detailed information regarding FACA requirements.

DOE's Facility Energy Testbed: Jeffery Marqusee (DOD) introduced two of the Department of Defense's environmental research programs. The Strategic Environmental Research and Development Program (SERDP) is DoD's environmental science and technology program, executed in partnership with DOE and EPA. Congress established SERDP in 1990 to address DOD environmental issues. The Department of Energy (DOE) and the Environmental Protection Agency (EPA) share management authority and responsibility with DoD. SERDP invests across a broad spectrum of basic and applied research, as well as advanced development.

The Environmental Security Technology Certification Program (ESTCP) is DOD's environmental technology demonstration and validation program. The Program was established in 1995 to promote the transfer of innovative technologies that have successfully established proof of concept to field or production use. ESTCP demonstrations collect cost and performance data to overcome the barriers to employ an innovative technology because of concerns regarding technical or programmatic risk, the so-called "Valley of Death." The Program's goal is to identify and demonstrate cost-effective technologies that address DoD's highest priority environmental requirements.

Together, these programs address the requirements of the DOD Services through from basic research through to demonstrations and final implementations. The intent is to accelerate the development and deployment of new technologies and approaches that address the Services' requirements with acceptable levels of risk. The investment approaches include broad area competitive solicitations, partnership arrangements, testbeds at DOD facilities with independent validation of operational cost and performance.

Currently, these programs invest $30M per year in testbed demonstrations of new technologies at 49 bases and facilities across the country. Projects range from advancing lighting controls to smart microgrids, continuous building commissioning, and building integrated PV roofs. These efforts help determine

both the cost implications and O&M outcomes from deploying new energy efficient and renewable energy technologies.

In Fiscal Year 2011, DOD energy costs totaled $15.2B split between operational ($11.2B) and facility consumption ($4B). DOD is looking to implement a DOD Energy Enterprise Systems to help monitor and manage DOD resources across the department. Electricity represents 64% of facility energy use. DOD's metering of facilities is nearing completion and additional work will be required to advance to the submetering level. DOD expects to have new future guidance on the use and deployment of metering and submetering solutions.

ESTCP *Demonstration Plan Guidance* was published in July 2010 that will facilitate accurate reporting and replication of the outcomes. The projects involved must address first and lifecycle costs, quantify performance objectives, anticipated O&M requirements, and satisfy information security requirements as appropriate. Completed projects are subject to independent technical review.

DOD is looking to share data and partner with other agencies on advanced building technology development and demonstrations. The scale of the DOD testbeds and the diversity represented in these testbeds provide a rich source of performance data.

Achieving High-Performance Federal Facilities: Kevin Kampschroer (GSA) presented an overview of the recently completed National Academies report *Achieving High-Performance Federal Facilities: Strategies and Approaches for Transformational Change.* The NAS report provides a detailed description of seven transformational approaches to achieve high-performance federal buildings. Impetus for the report came from GSA's experiences with the American Recovery and Reinvestment Act (ARRA). As part of that Act, GSA was provided with over $4B to update and renovate federal facilities to achieve higher levels of performance. Such a large increase in funding required that GSA approach the design, retrofit, and procurement of services in a radically different manner. New procedures and behaviors were needed to effectively execute these projects including design-build approaches, performance-based contracting requirements, and the use of integrated design teams.

GSA commissioned this report and cosponsored, with the BTRD and NAS, a workshop in the summer of 2010 dedicated to identifying these best practices. The goals at the onset were to move past incremental changes and focus on those transformational changes that will enable the federal portfolio to achieve the energy performance and sustainability goals mandated by Executive Orders and statutes in the future.

The barriers and challenges to high-performance federal buildings are well known. These challenges include: excess facilities that may not longer be needed; antiquated budget structures and processes; segmented building

design units; poor documentation, baselining, and performance reporting; misconceptions and biases about new approaches; inadequate workforce skills and training; risk aversive cultures impeding adoption of innovative technologies, and gaps in knowledge or lack of documentation on successful implementations.

The expert NAS panel identified seven *Levers for Change*:

1. Systems-Based Thinking
    - Basis for transformation approaches
    - Helps address ambiguous or conflicting goals
    - Uses lifecycle perspectives to integrate first costs with O&M
    - Helps overcome segmented budget and work process
2. Portfolio-Based Facilities management
    - Systematic planning, implementing, and administering of building portfolios. This may require legislative change.
3. Integrated Work Processes
    - Combining building/facilities perspectives in integrated work teams across a range of technical/professional disciplines
    - Move toward design, build, operate models of building management
4. Procurement, Contracting, and Finance
    - Streamlined, performance-focused procedures to leverage the USG market power needed to change market dynamics and advance new approaches for building systems, products, and services
    - Build incentives into new contracts
    - Use performance-based versus prescriptive requirements
5. Communication and Feedback for Behavioral Change
    - Strategies for broad dissemination of information related to successful approaches and new behaviors that drive new implementations and increase buy-in.
    - Develop means to measure and document change and their impacts
6. Standards and Guidelines
    - Robust, well-aligned standards, guidance, and best practices that drive federal and private sector use of sustainable approaches to O&M.
    - Raise the minimum performance bar to a higher level.
    - Develop best practice guides that document successes
7. Technologies and Tools
    - Effective and innovative sustainable technologies for widespread Federal adoption.

These seven levers combined with a systems approach to buildings will change work practices, effect enduring changes to buildings systems, and finally change the mindset behind the approaches used in current building process to enable

high-performance green buildings of the future. The full report can be found at http://www.gsa.gov/leversforchange.

Smart Buildings and FAST 50: GSA's Henry Singer provided an overview of the FAST50 program funded through the ARRA. Smart Buildings integrate major building systems into a common, connected network. This connectivity provides capabilities to improve energy efficiency, operational effectiveness, and occupant satisfaction. Standards for Smart Buildings include open communication protocols, unified control systems networks, and normalized data for system communications. The FAST 50 Strategy was developed for 50 existing buildings that comprise over 35M sq ft of floor space. For each, a Automated Building Analytics and Measurement System will be procured and implemented as

- Enterprise-class software solution
- Consolidated and integrated platform for future applications
- Software-based automated analytics
- Fault detection & diagnostics (FDD)
- Web-based operator interface

GSA will also be implementing a Sustainability Support/Network Operation Center that will provide support and allow of comparative examination of the performance of their building assets. This capability will allow GSA to improve their monitoring of specific building operations through raw performance data, gain knowledge through analytical approaches, develop trend and anomaly studies, and provide guidance on how to improve operations and maintenance.

Beyond improved energy efficiency and increased understanding of building functions, GSA expects to meet or exceed returns on investment (ROI) identified in their business case and better adapt to customer needs. GSA is expecting to finalize the procurement shortly.

Building Energy Data Initiative: Nick Sinai (OSTP) provided an update on the Building Energy Data Initiative. OSTP is collaborating with the Council on Environmental Quality (CEQ) and the MacArthur Foundation in a proposed May meeting that will focus primarily of multifamily residential buildings.

In advancing the availability of building data, OSTP has teamed with DOE, EPA, and NIST to develop a standardized means for sharing current building data information between DOE's Data Warehouse and Portfolio Manager. EPA is modifying Portfolio Manager to improve the data reporting capability. In addition, a large amount of building energy data (in excess of 20,000 records) from Fanny Mae may also be incorporated. Data will be available at www.energy.data.gov . Sinai expects that there will be both June and September deliverables related to the Better Buildings Initiative.

Closure: Grosshandler thanked the participants for the contributions and the meeting adjourned at 3:30pm.